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PATENT APPLICATION

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re the Application of

Toshiyuki INAGAKI Attn: PCT Branch

Application No. New U.S. National Stage of PCT/IB2004/004237

Filed: June 12, 2006 Docket No.: 128357

For: FUEL CELL STACK STRUCTURE

**SUBMISSION OF THE ANNEXES TO THE  
INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY**

Commissioner for Patents  
P.O. Box 1450  
Alexandria, VA 22313-1450

Sir:

Attached hereto is a copy of the annexes to the International Preliminary Report on Patentability (Form PCT/IPEA/409). The attached material replaces the claims.

Respectfully submitted,

James A. Oliff

Registration No. 27,073

William P. Berridge  
Registration No. 30,024

JAO:WPB/emt

Date: June 12, 2006

**OLIFF & BERRIDGE, PLC**  
P.O. Box 19928  
Alexandria, Virginia 22320  
Telephone: (703) 836-6400

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Enclosure of February 6, 2006

PCT Patent Application No.: PCT/IB2004/004237

Applicant: TOYOTA JIDOSHA KABUSHIKI KAISHA

Title: "Fuel Cell Stack Structure"

Our ref.: WO 43080

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**New claims**

10 1. A structure of a fuel cell stack comprising:  
 a plurality of cells (19) each formed by interposing  
 an MEA including an electrolyte membrane (11), an electrode  
 (14, 17), a catalyst layer and a diffusion layer (13, 16)  
 between two separators (18), each of the cells (19) having  
 15 a power generation region (35) in which power is generated  
 and a non-power generation region (36) in which power is  
 not generated, and  
 an adhesive layer (33) is provided between the  
 separators (18) in at least one of the cells (19), wherein  
 20 the non-power generation region (36) includes at least  
 one of:  
 (i) a region where the electrolyte membrane (11) is  
 located between the separators (18), and a portion of the  
 adhesive layer (33) is provided between the electrolyte  
 25 membrane (11) and one of the separators (18), and  
 (ii) another region where the electrolyte membrane  
 (11) is not located and another portion of the adhesive  
 layer (33) is provided between the separators (18),  
 characterized in that  
 30 said portion of the adhesive layer (33) between the  
 electrolyte membrane (11) and one of the separators (18) is  
 provided between the electrode (14, 17) and one of the  
 separators (18).  
 35 2. The structure of the fuel cell stack according to  
 claim 1, characterized in that the adjacent cells (19)  
 sandwich another adhesive layer (33).

3. The fuel cell stack structure according to claim 1 or 2, characterized in that the adhesive layer (33) has a Young's modulus of at most 100 MPa.

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4. The fuel cell stack structure according to claim 3, characterized in that the Young's modulus of the adhesive layer (33) is within a range of 50 MPa to 30 MPa.

10 5. The fuel cell stack structure according to claim 1 or 2, characterized in that the adhesive layer (33) has a thickness of 50  $\mu\text{m}$  to 150  $\mu\text{m}$ .

15 6. The structure of the fuel cell stack according to claim 1 or 2, characterized in that a rigid spacer (34) is provided in the adhesive layer (33).

20 7. The structure of the fuel cell stack according to claim 6, characterized in that the rigid spacer (34) is provided in the adhesive layer (33) throughout the non-power generation region (36).

25 8. The fuel cell stack structure according to claim 6 or 7, characterized in that the adhesive layer (33) has a thickness that allows the adhesive layer (33) to have a Young's modulus of at most 100 MPa even if the hard spacer is provided in the adhesive layer (33).

30 9. The fuel cell stack structure according to claim 1, characterized in that a plurality of multi-cell modules (40) each formed by stacking a plurality of said cells (19) are linearly arranged in a cell stacking direction, and that a bead gasket is provided as a seal between the multi-cell modules (40), and that a separator (18) of an 35 end cell of a multi-cell module (40) which contacts the

bead gasket has a greater planar rigidity than a separator (18) of a central cell of the multi-cell module (40).

10. The fuel cell stack structure according to claim  
5 9, characterized in that the planar rigidity of the  
separator (18) of the end cell of the multi-cell module  
(40) is made greater than the planar rigidity of the  
separator (18) of the central cell by placing a generally  
flat plate on the separator (18) of the end cell.

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11. The fuel cell stack structure according to claim  
1, characterized in that only the adhesive layer (33) is  
provided between the two separators (18).

15 12. The structure of the fuel cell stack according to  
claim 1, characterized in that the adhesive layer (33) is  
provided between the separators (18) in the entire non-  
power generation region (36).

20 13. The structure of the fuel cell stack according to  
claim 1, characterized in that the adhesive layer (33)  
contains rigid beads each of which has a diameter equal to  
or smaller than a thickness of the adhesive layer (33).

25 14. The structure of the fuel cell stack according to  
claim 1, characterized in that the separators (18) are  
metal separators.